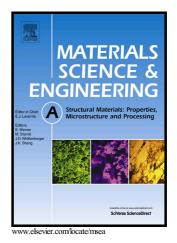
## Author's Accepted Manuscript

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### Effect of Temperature on Microstructure and Texture Evolutions during Uniaxial Compression of Commercially Pure Titanium

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#### ABSTRACT

Commercially pure (CP) titanium samples were subjected to uniaxial compression of 3, 10, 20, 30, 40 and 50 % reductions at room temperature (298 K), 673 K and 873 K respectively.  $\{10\overline{1}2\}$  type tensile twins were observed during the deformation at temperatures of 298 K and 673 K only. Volume fraction of these twins was increased up to 20 % reduction beyond which it was decreased on further increasing the % reduction. The non-basal orientations had higher Taylor factor values and were prone to twinning. On the other hand near-basal orientations were observed to be the possible twinning products. It was further observed that the volume fraction of dynamically recrystallized grains was increased with increase in % reductions at high temperatures. The initial non-basal texture of the samples was found to be transformed to dominant basal texture after deformation irrespective of the temperature of deformation. An abrupt transition of texture from non-basal to basal at a true strain of 0.22 of the samples deformed at a temperature of 873 K was observed and this may be attributed to the nucleation and growth of tensile twinning.

**Keywords:** CP-titanium, uniaxial compression, deformation twinning, dynamic recrystallization, microstructure, texture.

#### **1. Introduction**

Commercially pure (CP) titanium is widely used in different structural applications because of its high strength to weight ratio, high biocompatibility, ease of fabrication and excellent corrosion resistance [1,2]. The performance of this material depends on suitable microstructure and texture that are formed during different thermo-mechanical processing. Thus,

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